

### **REMARKS**

Reconsideration of the application in view of the above amendments and the following remarks is respectfully requested.

#### **I. Status of the Claims**

Claims 11-15 and 17-23 are pending. Claims 1-10 are withdrawn from further consideration, as being drawn to a provisionally non-elected invention. Claim 16 was cancelled by prior amendment without prejudice or disclaimer to the subject matter recited therein. Claims 11 has been amended. No new matter is added

Support for the amendment to claim 11 can be found in the specification at, for example, page 13, lines 5-12 and page 14, line 19 bridging page 15, line 7.

#### **Rejections under 35 U.S.C. §102**

Claims 11, 17, 18 and 20-22 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Published Application No. 2003/0015724 to Nakamura. Because Nakamura fails to disclose, or suggest, all the features of amended independent claim 11, Applicants respectfully submit that claims 11, 17, 18 and 20-22 distinguish over Nakamura for at least this reason.

Applicants submit that Nakamura discloses an active layer consisting of In-rich regions 54a and an In-poor regions 54b. *See* Nakamura, ¶0075-76; Fig. 6. Nakamura discloses an In GaN quantum well layer in which the In-rich regions 54a and In-poor regions 54b are formed **horizontally** — specifically “Each indium-rich region 54a and each indium-poor region 54b are alternately arranged substantially regularly in the plane direction of the well layer.” Nakamura, ¶0076 (emphasis added). Further, Nakamura merely discloses an  $\text{In}_{0.2}\text{Ga}_{0.8}\text{N}$  quantum well layer with In-rich regions 54a. Nakamura, ¶¶0090, 0112 and 0120. Nakamura discloses that In-rich regions 54a correspond to  $\text{In}_{0.4}\text{Ga}_{0.6}\text{N}$  and In-poor regions almost correspond to  $\text{In}_{0.02}\text{Ga}_{0.98}\text{N}$ . Nakamura, ¶0122.

Amended independent claim 11 now recites “wherein the single quantum well layer comprises, sequentially along the growth direction, an In-rich region, a first compositional grading region with In content increasing between the top layer of  $\text{Al}_x\text{Ga}_y\text{In}_{1-x-y}\text{N}$  ( $0 \leq x \leq 1$ ,  $0 < y \leq 1$ ,  $0 < x+y \leq 1$ ) and the In-rich region, and a second compositional grading region with In content decreasing between the In-rich region and the additional nitride semiconductor layer.” Nakamura merely discloses In-rich and In-poor regions along “the plane direction of the well layer” (see Nakamura, ¶0076). In contrast, independent claim 11 recites a quantum well layer comprising compositional grading regions “sequentially along the growth direction.”

Further, claim 11 recites that “Ga in the In-rich InGaN being mainly supplied from the top layer of  $\text{Al}_x\text{Ga}_y\text{In}_{1-x-y}\text{N}$  ( $0 \leq x \leq 1$ ,  $0 < y \leq 1$ ,  $0 < x+y \leq 1$ ).” In contrast, Nakamura discloses that In-rich region 54a corresponds to  $\text{In}_{0.4}\text{Ga}_{0.6}\text{N}$  and In-poor regions almost correspond to  $\text{In}_{0.02}\text{Ga}_{0.98}\text{N}$ . Nakamura, ¶0122. Therefore, Nakamura does not disclose each and every feature of amended independent claim 11.

Claims 17, 18 and 20-22 depend from claim 11, and recite the features of claim 11 as if set forth therein. Accordingly, claims 17, 18 and 20-22 distinguish over Nakamura for at least the same reasons as claim 11 demonstrated above. Thus, Nakamura does not anticipate claims 11, 17, 18 and 20-22. Reconsideration and withdrawal of the rejection is respectfully requested.

### **Rejections under 35 U.S.C. §103**

Claims 12, 14, 15, 19 and 23 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Nakamura in view of U.S. Published Application No. 2004/0195598 to Tysoe. Claim 13 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Nakamura in view of U.S. Published Application No. 2003/0209704 to Yamada. Applicants respectfully traverse these rejection.

The Examiner acknowledges that Nakamura fails to disclose all the features of claims 12, 14, 15, 19 and 23. However, the Examiner relies on Tysoe as disclosing those of claims 12, 14, 15, 19 and 23 features missing from Nakamura. Additionally, the Examiner acknowledges that Nakamura fails to disclose all the features of claim 13. However, the Examiner relies on Yamada as disclosing those of claim 13 features missing from Nakamura.

Tysoe discloses composition  $\text{In}_x\text{Ga}_{1-x}\text{N}$ , where  $0 \leq x \leq 1$ . However, Tysoe fails to disclose, or suggest, an In-rich InGaN quantum well layer wherein Ga in this layer is mainly supplied from the underlying layer, as demonstrated above to be set forth in independent claim 11. Therefore, Tysoe does not cure the deficiencies of Nakamura discussed above. Therefore, Nakamura and Tysoe in combination does not render claims 12, 14, 15, 19 and 23 obvious.

Further, a person of ordinary skill in the art at the time of the invention would not know what structure would result from the combination of Nakamura ( $\text{In}_{0.2}\text{Ga}_{0.8}\text{N}$  quantum well layer with In-rich regions 54a and In-poor regions 54b) with Tysoe (In-rich  $\text{In}_x\text{Ga}_{1-x}\text{N}$  quantum well layer). Accordingly, the combination of Nakamura and Tysoe does not result in the invention of claims 12, 14, 15, 19 and 23.

Yamada relates to a multi-quantum well structure with a first well layer and a second well layer having a different wavelength with the first well layer in which the degree  $R(=S/L$  [S: total length of dished portions D, L; total length of active layer]) has a certain value (for example, not less than 0.1) to provide a smooth or flat interface with a barrier layer for high crystallinity. Yamada ¶¶0030, 0038.

Claim 13 depends from claim 11, and recites those features as if set forth therein. Yamada does not cure the deficiencies of Nakamura discussed above. Further, the combination of Nakamura (quantum well layer with In-rich regions 54a and In-poor regions 54b) with Yamada (flattening the dished portion D), does not result in the invention of claim 13. Therefore, the combination of Nakamura and Tysoe does not render claim 13 obvious.

Applicants respectfully request that the rejection of claim 13 be reconsidered and withdrawn.

**CONCLUSION**

Each and every point raised in the Office Action mailed June 23, 2008, has been addressed on the basis of the above remarks. In view of the foregoing it is believed that all the claims are in condition for allowance and it is respectfully requested that the application be reconsidered and that all pending claims be allowed and the case passed to issue.

If there are any other issues remaining which the Examiner believes could be resolved through a Supplemental Response or an Examiner's Amendment, the Examiner is respectfully requested to contact the undersigned at the telephone number indicated below. In view of the above amendment, applicant believes the pending application is in condition for allowance.

Dated: September 23, 2008

Respectfully submitted,

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